

NIAGARA AIR QUALITY  
SURVEY REPORT - 1987

(Occidental Chemical Corporation  
Niagara Falls, New York, USA)

NON-AQUEOUS  
PHASE LIQUID (NAPL)  
INCINERATION TEST

OCTOBER 1987

ARB-166-87-AR/SP

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Ontario

Ministry  
of the  
Environment

E. PICHÉ, Director  
Air Resources Branch

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Prepared for:

The Minister's Office  
and the  
Niagara River Improvement Programme  
Intergovernmental Relations and Strategic Projects Division  
Ministry of the Environment

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## EXECUTIVE SUMMARY

At the request of the Minister's Office and the Ministry's Niagara River Improvement Programme, Mobile Air Monitoring Units #2 and #3 (the TAGA 3000) of the Air Resources Branch conducted an ambient air quality survey in the Niagara Falls area of Ontario from October 8 to 12, 1987. As with a previous survey conducted in November of 1986 (ARB-048-87-AQM), the objectives were to provide on-site real-time screening of the ambient air for selected polychlorinated biphenyl congeners and other chlorinated organics at times when Occidental Chemical Corporation was conducting tests at its liquid hazardous waste incineration facility in Niagara Falls, New York, USA.

During the incineration tests, the winds were such that the gaseous emissions from the Occidental liquid hazardous waste incineration facility were carried into the United States. Since the monitoring units were restricted to the Canadian side of the Niagara River, only upwind air quality parameters could be measured.

From the acquired air quality data, none of the selected polychlorinated biphenyl congeners nor any of the other 36 chlorinated organics were detected. All concentration measurements were very low and the air quality was found to be very similar to that reported during the November 1986 survey. None of the applicable Ministry of the Environment Air Quality Criteria or Guidelines were exceeded and in general, the results were indicative of a relatively clean urban environment.

## SOMMAIRE

À la demande du bureau du ministre et du programme d'amélioration du Niagara relevant du Ministère, les unités mobiles de surveillance de l'air n° 2 et n° 3 (analyseur des gaz atmosphériques à l'état de trace - Modèle 3000) de la Direction des ressources atmosphériques ont procédé à une étude de la qualité de l'air ambiant dans la région de Niagara Falls, en Ontario, du 8 au 12 octobre 1987. Tout comme lors d'une étude précédente, effectuée en novembre 1986 (ARB-048-87-AQM), il s'agissait de dépister sur place, en temps réel, dans l'air ambiant, certaines substances assimilables aux biphényles polychlorés et d'autres substances organiques chlorées, lorsque la société Occidental Chemical Corporation effectuait des essais à son usine d'incinération des déchets liquides dangereux de Niagara Falls (État de New York) aux États-Unis.

Lors de ces essais d'incinération, les vents poussaient les gaz libérés par l'usine vers les États-Unis. Les unités de surveillance n'étant installées que sur la rive canadienne du Niagara, seuls les paramètres de qualité de l'air dans le vent par rapport à l'usine ont pu être mesurés.

D'après les données recueillies, on n'a détecté aucun des produits assimilables aux biphényles polychlorés ni des 36 autres substances organiques chlorées. Toutes les mesures de concentration étaient très faibles et la qualité de l'air s'est avérée très similaire à ce qu'avait révélé l'étude de novembre 1986. En aucun cas les critères ou lignes directrices sur la qualité de l'air ambiant du ministère de l'Environnement n'ont été dépassés et, en général, les résultats indiquaient un environnement urbain relativement pur.

## 1.0 INTRODUCTION

Occidental Chemical Corporation of Niagara Falls, New York, made a submission to the New York State Department of Environmental Conservation for the destruction of NAPL (non-aqueous phase liquid) landfill waste from Hyde Park in Niagara Falls, New York. In this submission, a 3-phase test burn programme was proposed. For the first phase, the liquid hazardous waste incineration facility of Occidental Chemical Corporation was tested to demonstrate destruction efficiency and compliance with US Federal and State Regulations for the disposal of regular in-house plant wastes. This programme was carried out from October 16 to 21, 1986 and the results were reviewed by the US EPA (United States Environmental Protection Agency), the Ontario MOE (Ministry of the Environment) and other agencies. Permission was then given for the second phase which dealt solely with the destruction efficiency of PCBs (polychlorinated biphenyls). PCB oil from Occidental's plant in Taft, Louisiana was blended with transformer oil from Niagara Mohawk and this feed was used for the second phase incineration test. The second phase was conducted from November 5 to 10, 1986 and during this time, MAMUs #1 and #3 (Mobile Air Monitoring Units #1 and #3) of the ARB (Air Resources Branch) conducted an air quality survey on the Canadian side of the Niagara River with objectives of providing near real-time on-site screening of the ambient air for selected PCBs and other chlorinated organics. No PCBs were detected and the results of this survey were presented in MOE report ARB-048-87-AQM. The results of this second phase met the USA EPA Criteria and were presented at a Public Hearing in Niagara Falls, New York. The third phase, the incineration of NAPL from Hyde Park, was allowed to proceed. Prior to incineration, analyses of the NAPL waste revealed concentrations of approximately 10 ppm (parts per million) of dioxins/furans and approximately 10 ppm of PCBs. In addition, this waste was spiked with 1,1,1-trichloroethane in order to demonstrate destruction efficiency. The third phase incineration tests were carried out from October 8 to 12, 1987.

At the request of the Minister's Office and the Niagara River Improvement Programme, MAMUs #2 and #3 of the Air Resources Branch conducted an ambient air quality survey in the Niagara Falls area of Ontario. This survey lasted from October 8 to 12, 1987 and the objectives were to provide on-site real-time screening of the ambient air for selected polychlorinated biphenyl congeners and other chlorinated organics at times when Occidental Chemical Corporation was conducting incineration tests in Niagara Falls, New York, USA.

MAMU #3 contains the TAGA 3000 system which was set up solely to measure ambient concentrations of PCBs. Briefly, the TAGA (Trace Atmospheric Gas Analyzer) 3000 is a specialized single

quadrupole mass spectrometer fitted with an APCI (Atmospheric Pressure Chemical Ionization) source. When monitoring PCBs, the ion source is directly coupled to a computer controlled preconcentrator and thermal desorption device called an ASTA (Automated Short Term Adsorber). The TAGA/APCI/ASTA technique provides PCB concentration measurements based on 2-minute ambient air samples. A half-hour average concentration of PCB was then computed by averaging the concentrations from 15 consecutive 2-minute samples. In this study, the selected PCB congeners were the di-, tri-, tetra- and pentachlorobiphenyls. The PCB detection limits (DLs) were typically 0.01  $\mu\text{g}/\text{m}^3$  per congener or 0.04  $\mu\text{g}/\text{m}^3$  for the total di- to pentachlorobiphenyls. A more detailed description of this methodology is contained in report ARB-048-87-AQM.

The instrumentation of MAMU #2 can simultaneously measure a wide variety of gaseous contaminants that could be in the ambient air. This is possible through the use of dedicated analyzers (Table 1) that continuously measure concentrations of up to 11 different common contaminants at the sub ppm (parts per million) level and a high resolution gas chromatographic (GC) system that has the capability of identifying and quantitating up to 138 different organic compounds in the range of 1 to 10  $\mu\text{g}/\text{m}^3$  (Table 2). For this survey, the common contaminants of interest were Total Hydrocarbon Compounds (THC), Carbon Monoxide (CO) and Nitrogen Dioxide ( $\text{NO}_2$ ) and the organics of interest were the 36 chlorinated compounds with special attention given to 1,1,1-trichloroethane.

The Occidental Chemical Corporation is situated in the chemical valley east of Niagara Falls, New York, and along the north shore of the Niagara River (Figure 1). The nearest Canadian territory is the south shore of the Niagara River, approximately 3 km SSW of this facility. Both monitoring units were stationed in this area and on-site wind direction and speed were closely monitored. If the winds were from the NNE to ENE quadrant, gaseous emissions from Occidental's liquid hazardous waste incineration facility would impinge on this nearby Canadian territory. To supplement the on-site recordings, meteorological information (weather forecasts and surface analysis (Table 3)) from the Buffalo weather office was also utilized during this survey.

## 2.0 DISCUSSION OF RESULTS

### 2.1 General

Both monitoring units arrived in Niagara Falls, Ontario on October 7, 1987 and were immediately placed on stand-by at the Second Intake for Ontario Hydro on the Canadian side of the Niagara River, approximately 3 km southwest of Occidental Chemical Corporation of Niagara Falls, New York (Figure 1). This was the same monitoring location used during November of 1986 and visual observation of stack emissions from Occidental's incineration facility was possible from this site.

On October 7, complete calibrations were performed on all analyzers housed in these monitoring units.

Mr. Gary Wong, a source assessment engineer from the Emission Technology and Regulation Development Section of the Air Resources Branch, was the Ministry's on-site observer at Occidental. The monitoring staff was informed that the third phase would commence on October 8 and would be comprised of 3 separate tests. In reality, the programme did commence as scheduled but there were 4 tests finally ending at 16:00 hrs local time on October 12, 1987.

### 2.2 Thursday, October 8

A north-south orientated high pressure ridge located over Lake Superior was forecast to move to lie near Montreal by early Friday. Initially, light rain was reported in the Niagara region on October 8. By noon, it was partially sunny however, it still remained cool with the ambient temperature approaching 10 °C (Celsius). As noted in Table 3, moderate northwesterly winds at 14 kts (knots) were reported at Buffalo, New York. During the morning, surface winds from the northwest at 18 km/hr were recorded by the MAMUs and as the day evolved, the winds backed and decreased to become westnorthwesterly at 10 km/hr after 16:30 hrs.

Because of the prevailing winds, the Canadian side of the Niagara River was upwind of the Occidental Chemical Corporation liquid hazardous waste incineration facility in Niagara Falls, New York State.

As reported by Mr. Wong, conditioning and pretesting of the incinerator was performed during the morning. The NAPL feed was introduced to the incinerator at 16:00 hrs. At 16:35 hrs, in-stack testing commenced. At 21:00 hrs, the testing was completed and the NAPL feed was halted (Table 4).

Although the monitoring site was upwind, screening of the ambient air and determining air quality parameters on the Canadian side of the Niagara River was deemed necessary for future comparisons if the emissions from Occidental were to impinge on Canadian territory. MAMU #2 started acquiring ground level concentration (GLC) data for the common contaminants at 10:00 hrs. (This monitoring continued throughout the day and lasted until survey end on Monday, October 12. A concentration/time graph for these data is presented in Figure 2 in the appendix.) Meanwhile, two calibrations were run on the TAGA 3000 system in order to determine the daily detection limits (DLs) for PCBs. The results of these two calibrations were 40 and 30 ng/m<sup>3</sup> (nanograms per cubic metre) for an average of 35 ng/m<sup>3</sup> for the di- to penta-chlorobiphenyls. Starting at 10:11 hrs, a one-hour VOC (Volatile Organic Compound) sample was taken and then immediately analyzed by the GC system. Another VOC sample was acquired at 12:58 hrs. Between 16:23 and 21:00 hrs (the times of the actual NAPL feed incineration), 2 more one-hour VOC samples and 8 half-hour PCB samples were acquired. From all of these air quality data (Tables 5 and 6), no PCBs or any other chlorinated organics were detected (refer to Table 2 for the DLs of the chlorinated organics). For the other organics, a maximum of only 15 different compounds were identified and the total organic concentrations ranged from 18 to 35 ug/m<sup>3</sup> (for an average of 24 ug/m<sup>3</sup>) with the alkanes and aromatics comprising 57 and 43% of these totals respectively (Table 5). The respective maximum one-hour average GLCs for common contaminants CO, THC and NO<sub>2</sub> were 0.4, 1.2 and 0.02 ppm (Table 6).

### 2.3 Friday, October 9

A low pressure area centered over Lake Superior was forecast to move eastward to lie over central Quebec by early Saturday. Because of this system, the air mass in southern Ontario was moist and unstable resulting in overcast and scattered shower conditions throughout the day. The ambient daytime temperature was usually in the low teens. During the morning, the winds were from the south at 10 kts (Table 3) but as the cold front associated with this low pressure area approached, the winds veered to become by mid-afternoon, southwesterly at 15 kts. Between 10:30 and 16:00 hrs, the on-site winds were southerly at 8 km/hr (Table 6).

The Canadian side of the Niagara River was upwind of the Occidental facility in Niagara Falls, New York.

Mr. Al Meadows, a senior technologist in the Source Monitoring Section of the Pollution Measurement Division of Environment Canada, was the on-site observer for this day. At the incinerator, the NAPL feed commenced at 10:30 hrs. The stack sampling/testing commenced at 10:50 hrs and ended at 15:55 hrs. The NAPL feed was halted at 16:00 hrs.

Apart from the continuous measurements of the common contaminants, one VOC sample was acquired and analyzed by the GC system of MAMU #2; one PCB calibration was run on the TAGA 3000 system of MAMU #3; and four half-hour samples for PCB detection were accrued (Tables 4 and 5). Once again, no PCBs (a detection limit of 29 ng/m<sup>3</sup> being determined from the calibration) or other chlorinated organics were detected in the acquired samples (Table 6). Fourteen different organics were detected in the VOC sample and the total organic concentration was only 26 ug/m<sup>3</sup> (Table 5). Low concentrations were also determined for the common contaminants as the maximum one-hour average GLCs for CO, THC and NO<sub>2</sub> were 0.4, 1.4 and 0.02 ppm respectively (Table 6).

#### 2.4 Saturday, October 10

The aforementioned cold front moved through Niagara Falls just after midnight. The winds continued to veer and by mid-morning, they were northnorthwesterly at 10 kts (Table 3). The air mass was moist and stable during the morning giving way to sunny periods by early afternoon with daytime temperatures approaching 10°C. Between 10:00 and 15:00 hrs, northerly winds at 16 km/hr were recorded on-site (Table 6).

The Canadian side of the Niagara River was upwind of the Occidental facility in Niagara Falls, New York.

According to Mr. Al Meadows, incineration of the NAPL waste commenced at 10:05 hrs. The stack sampling/testing was carried out from 10:25 to 15:10 hrs and the NAPL feed was halted at 15:20 hrs (Table 4).

Two PCB calibrations were performed on the TAGA 3000 mass spectrometer system and from this, the daily PCB detection limit was determined to be 38 ng/m<sup>3</sup>. Between 10:00 and 15:00 hrs, 3 half-hour samples were accrued with no PCBs being detected (Table 6). No VOC sampling programme was carried out; however, monitoring of the common contaminants continued. Between 10:05 and 15:05 hrs, low GLCs were determined for these contaminants as the respective maximum one-hour average GLCs of CO, THC and NO<sub>2</sub> were only 0.4, 1.7 and 0.02 ppm (Table 6).

#### 2.5 Monday, October 12

A northeast-southwest orientated high pressure ridge over Lake Superior dictated the weather in southern Ontario on this date. The air mass was dry and stable and the ambient daytime temperature approached 10°C. The sky condition was scattered to broken cumulus and the winds were light westerly. Between 09:35 and 15:35 hrs, westerly winds at 3km/hr were monitored by the MAMUs (Table 6).

This was the last day of testing at the Occidental liquid hazardous waste incinerator in Niagara Falls, New York and because of the wind, the Canadian side of the Niagara River was still upwind of this facility.

The on-site observer was Mr. Paul Gorman, the principal chemical engineer with Midwest Research Institute of Kansas City. The NAPL waste feed started at 09:30 hrs and after some delay, the testing commenced at 11:55 hrs. The testing continued until 16:07 hrs and the NAPL waste feed was halted at 16:10 hrs (Table 4).

Two PCB calibrations were performed and the daily detection limit for PCBs was determined to be 36 ng/m<sup>3</sup>. Between 09:30 and 16:10 hrs, the TAGA 3000 system screened the ambient air for PCBs. Four half-hour ambient air samples were accrued but no PCBs were detected (Table 6). Low concentrations were also measured for the common contaminants during this period. The respective maximum one-hour average GLCs of CO, THC and NO<sub>2</sub> were 0.4, 1.4 ppm and ND (not detected or less than 0.01 ppm) (Table 6). One one-hour VOC sample was acquired at 11:20 hrs and the GC analyses of this sample again revealed very low concentrations (Table 5). Thirteen different organics (no chlorinated species) were detected and the total organic concentration was only 24 ug/m<sup>3</sup>.

#### 4.0 SUMMARY

At the request of the Minister's Office and the Niagara River Improvement Programme, Mobile Air Monitoring Units #2 and #3 (TAGA 3000) of the Air Resources Branch conducted an ambient air quality survey in the Niagara Falls area of Ontario from October 8 to 12, 1987. As with a previous survey conducted in November of 1986 (ARB-048-87-AQM), the objectives were to provide on-site real-time screening of the ambient air for selected polychlorinated biphenyl congeners and other chlorinated organics at times when Occidental Chemical Corporation was conducting incineration tests of NAPL waste in Niagara Falls, New York, USA.

During the incineration tests, the winds were such that the gaseous emissions from the Occidental liquid hazardous waste incineration facility were carried into the United States. The winds ranged from the southwest to north during these periods and the monitoring units, restricted to the Canadian side of the Niagara River, could only determine upwind air quality parameters.

During the four days of monitoring, 19 half-hour ambient air samples were accrued for PCB analysis and 6 one-hour ambient air samples were analyzed for organic content. None of the selected PCB congeners nor any of the 36 different chlorinated organics (especially 1,1,1-trichloroethane) were detected in any of these samples. That is, if these compounds existed in the ambient air, they were at concentrations less than the detectable limits as determined by the individual analyzers. For the selected PCB congeners, the detection limits ranged from 29 to 38 ng/m<sup>3</sup> (as determined daily by the TAGA 3000 mass spectrometer system) and for the other chlorinated organics, the detection limits were in the range of 0.3 to 5 ug/m<sup>3</sup> (as determined by the GC system).

Low concentrations were also determined for the other ambient air quality data. From the 6 one-hour samples analyzed by the GC for organic content, an average of 14 different organics were detected and the average total organic concentration was only 25 ug/m<sup>3</sup>. For the common contaminants, approximately 100 hours of continuous measurements were acquired. During the incineration tests, the maximum one-hour average concentration of carbon monoxide was only 0.4 ppm; for total hydrocarbon compounds, 1.4 ppm; and for nitrogen dioxide, 0.02 ppm.

In conclusion, the air quality data were very similar to those reported during the November 1986 survey. None of the applicable Ministry of the Environment Air Quality Criteria or Guidelines were exceeded and in general, the results were indicative of a relatively clean urban environment.

APPENDIX:      The Data

Figure 1  
General Survey Area for the 1987 Niagara Survey

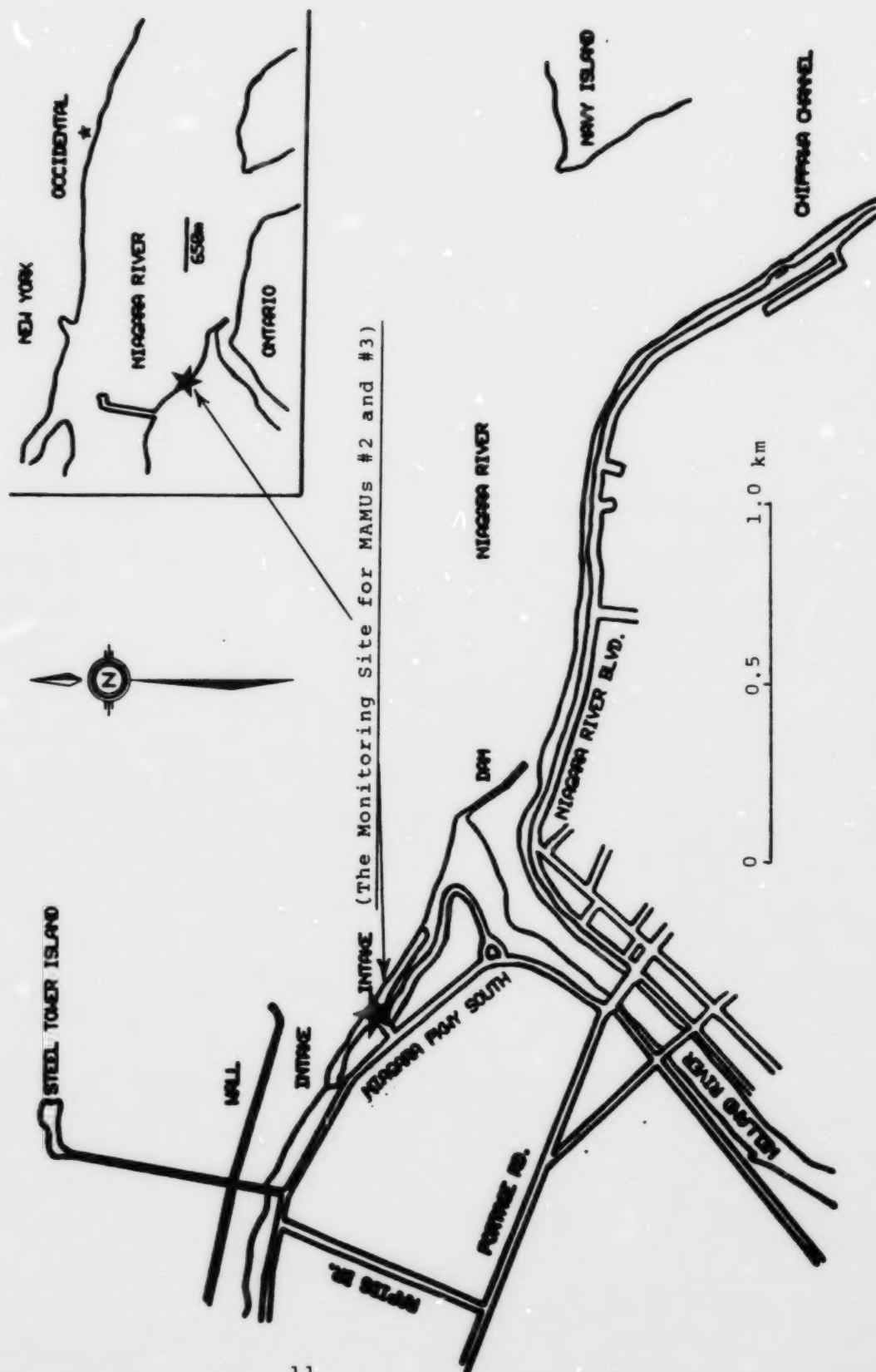


Table 1

## THE INSTRUMENTATION OF MOBILE AIR MONITORING UNIT #2

| Instrument                                                  | Manufacturer                                    | Analytical Technique   | Full Scale Sensitivity                        |
|-------------------------------------------------------------|-------------------------------------------------|------------------------|-----------------------------------------------|
| THC, CH <sub>4</sub> , TH-M analyzer                        | Ingenieur-Produktions-Gruppe Munchen (IPM) RS-t | Dual flame ionization  | 50 ppm THC (as CH <sub>4</sub> )              |
| H <sub>2</sub> S, SO <sub>2</sub> , NO <sub>x</sub> sources | Hartmann & Braun Prufgasgenerator               | N/A                    | N/A                                           |
| TRS analyzer                                                | Monitor Labs 8850 c/w ML 8770                   | Fluorescence           | 0.5 ppm H <sub>2</sub> S                      |
| SO <sub>2</sub> analyzer                                    | Monitor Labs 8850                               | Fluorescence           | 0.5 ppm SO <sub>2</sub>                       |
| NO <sub>x</sub> , NO <sub>2</sub> , NO analyzer             | Monitor Labs 8840                               | Chemi-Luminescence     | 1.0 ppm NO <sub>x</sub> (as NO <sub>2</sub> ) |
| CO analyzer                                                 | Thermo Electron P48                             | Gas Filter Correlation | 100 ppm CO (digital)                          |
| O <sub>3</sub> analyzer/source                              | Dasibi 1003-AAS                                 | UV Absorption          | 1.0 ppm O <sub>3</sub> (digital)              |
| Hg analyzer                                                 | Scintrex HGP-2                                  | UV Absorption          | 50 ug/m <sup>3</sup>                          |

Hewlett Packard Data Acquisition System - HP 85 and HP 3497A

|                   |                                                                 |                       |                         |
|-------------------|-----------------------------------------------------------------|-----------------------|-------------------------|
| Gas Chromatograph | HP 5880 Dual Capillary Column c/w HP 86 Data Acquisition System | Flame Ionization Det. | as set per calibrations |
|-------------------|-----------------------------------------------------------------|-----------------------|-------------------------|

## Meteorological Instrumentation

| Instrument          | Manufacturer              | Scale                      |
|---------------------|---------------------------|----------------------------|
| ** Wind speed       | Lambrecht GmbH            | km/hr                      |
| ** Wind direction   | Lambrecht GmbH            | degrees                    |
| Temperature         | Weather Measure (WM) T621 | degrees Celsius            |
| Humidity            | WM-HM-11P                 | absolute & %               |
| Barometric pressure | WM-BM70-B242              | millibars                  |
| Solar Radiation     | WM Star Pyranometer       | milliwatts/cm <sup>2</sup> |

\*\* These instruments are located on top of a 10 metre retractable tower

Table 2

## Characteristics of the Organics Measured by the Gas Chromatographic Systems of MAMU #2

All concentrations are in terms of  $\mu\text{g}/\text{m}^3$  (micrograms per cubic metre) Updated October 16, 1987

|                           | Detection Limits | Standards, Guidelines or Provisional Guidelines | Criterion  | TWA     | STEL    | Alternate Names                |
|---------------------------|------------------|-------------------------------------------------|------------|---------|---------|--------------------------------|
| 1 PROPANE                 | 0.2              |                                                 |            |         |         |                                |
| 2 PROPADIENE              | 0.3              |                                                 |            |         |         | ALLENE                         |
| 3 PROPYNE                 | 0.3              |                                                 |            |         |         | METHYL ACETYLENE               |
| 4 CYCLOPROPANE            | 0.3              |                                                 |            |         |         |                                |
| 5 2-METHYLPROPANE         | 0.3              |                                                 |            |         |         | ISOBUTANE                      |
| 6 CHLOROETHENE            | 0.3              | 560 (2)                                         | 280 (A)    | 5000    | 10000   | VINYL CHLORIDE; CHLOROETHYLENE |
| 7 1-BUTENE                | 0.3              |                                                 |            |         |         |                                |
| 8 1,3-BUTADIENE           | 0.3              |                                                 |            |         |         |                                |
| 9 BUTANE                  | 0.2              |                                                 |            |         |         | *n-BUTANE*                     |
| 10 1-BUTYNE               | 0.3              |                                                 |            | 1900000 |         | ETHYLACETYLENE                 |
| 11 CHLOROETHANE           | 0.3              |                                                 |            | 2600000 | 3250000 | ETHYL CHLORIDE                 |
| 12 3-METHYL-1-BUTENE      | 0.3              |                                                 |            |         |         | ISOMYLENE                      |
| 13 2-METHYLBUTANE         | 0.3              |                                                 |            |         |         | ISOPENTANE                     |
| 14 2-METHYL-1-BUTENE      | 0.3              |                                                 |            |         |         |                                |
| 15 PENTANE                | 0.2              |                                                 |            | 1800000 | 2250000 | *n-PENTANE*                    |
| 16 2-METHYL-1,3-BUTADIENE | 0.4              |                                                 |            |         |         | ISOPRENE                       |
| 17 trans-2-PENTENE        | 0.2              |                                                 |            |         |         |                                |
| 18 cis-2-PENTENE          | 0.2              |                                                 |            |         |         |                                |
| 19 DICHLOROMETHANE        | 1.5              | 100000 (1)                                      | 100000 (B) | 350000  | 1740000 | METHYLENE CHLORIDE             |
| 20 2-METHYL-2-BUTENE      | 0.3              |                                                 |            |         |         | NEOHEXANE                      |
| 21 2,2-DIMETHYLBUTANE     | 0.2              |                                                 |            |         |         |                                |

Table 2 ctd.

## Characteristics of the Organics Measured by the Gas Chromatographic Systems of MANU #2

All concentrations are in terms of  $\mu\text{g}/\text{m}^3$  (micrograms per cubic metre)

Updated October 16, 1987

|                             | Detection Limits | Standards, Guidelines or Provisional Guidelines | Criterion  | TWA      | STEL    | Alternate Names                                |
|-----------------------------|------------------|-------------------------------------------------|------------|----------|---------|------------------------------------------------|
|                             |                  |                                                 |            |          |         |                                                |
| 22 trans-1,2-DICHLOROETHENE | 0.3              |                                                 |            |          |         |                                                |
| 23 3-METHYL-1-PENTENE       | 0.2              |                                                 |            |          |         |                                                |
| 24 4-METHYL-1-PENTENE       | 0.2              |                                                 |            |          |         |                                                |
| 25 CYCLOPENTANE             | 0.2              |                                                 |            |          |         |                                                |
| 26 2,3-DIMETHYLBUTANE       | 0.2              |                                                 |            |          |         |                                                |
| 27 2-METHYLPENTANE          | 0.2              |                                                 |            |          |         |                                                |
| 28 3-METHYLPENTANE          | 0.2              |                                                 |            |          |         |                                                |
| 29 1-HEXENE                 | 0.3              |                                                 |            |          |         |                                                |
| 30 cis-1,2-DICHLOROETHENE   | 0.3              |                                                 |            |          |         |                                                |
| 31 2-CHLOROBUTANE           | 0.6              |                                                 |            |          |         | cis-1,2-DICHLOROETHYLENE; SYN-DICHLOROETHYLENE |
| 32 1-CHLORO-2-METHYLPROPANE | 0.4              |                                                 |            |          |         | sec-BUTYL CHLORIDE                             |
| 33 HEXANE                   | 0.3              |                                                 |            |          | 790000  | 1000000                                        |
| 34 TRICHLOROMETHANE         | 2.2              | 35000 (2)                                       | 12000 (A)  | 180000   |         | *n-HEXANE*                                     |
| 35 trans-3-HEXENE           | 0.3              | 1500 (2)                                        | 500 (A)    | 5000     | 225000  | CHLOROPORM                                     |
| 36 3-CHLORO-2-METHYLPROPENE | 0.3              |                                                 |            |          |         | ISOBUTENYL CHLORIDE                            |
| 37 METHYLCYCLOPENTANE       | 0.2              |                                                 |            |          |         |                                                |
| 38 2,4-DIMETHYLPENTANE      | 0.2              |                                                 |            |          |         |                                                |
| 39 1,2-DICHLOROETHANE       | 0.2              |                                                 |            | 40000    | 60000   | ETHYLENE CHLORIDE                              |
| 40 2,2-DIMETHYLPENTANE      | 0.4              |                                                 |            |          |         |                                                |
| 41 2,2,3-TRIMETHYLBUTANE    | 0.2              |                                                 |            |          |         |                                                |
| 42 1,1,1-TRICHLOROETHANE    | 1.0              | 350000 (1)                                      | 115000 (A) | 19000000 | 2450000 | METHYL CHLOROPORM                              |

Table 2 ctd.

## Characteristics of the Organics Measured by the Gas Chromatographic Systems of MANU #2

All concentrations are in terms of  $\mu\text{g}/\text{m}^3$  (micrograms per cubic metre) Updated October 16, 1987

|                           | Detection Limits | Standards, Guidelines or Provisional Guidelines | Criterion  | TWA     | STEL    | Alternate Names                        |
|---------------------------|------------------|-------------------------------------------------|------------|---------|---------|----------------------------------------|
| 43 1-CHLOROBUTANE         | 0.4              |                                                 |            |         |         | n-BUTYL CHLORIDE                       |
| 44 BENZENE                | 0.2              | 10000 (1)                                       | 3300 (A)   | 30000   | 75000   |                                        |
| 45 TETRACHLOROMETHANE     | 0.9              | 1800 (2)                                        | 600 (A)    | 20000   | 125000  | CARBON TETRACHLORIDE                   |
| 46 3,3-DIMETHYLPENTANE    | 0.2              |                                                 |            |         |         |                                        |
| 47 CYCLOHEXANE            | 0.2              | 300000 (2)                                      | 100000 (A) | 1050000 | 1300000 | HEXAHYDROBENZENE                       |
| 48 2,3-DIMETHYLPENTANE    | 0.3              |                                                 |            |         |         |                                        |
| 49 2-METHYLHEXANE         | 0.5              |                                                 |            |         |         | ISOHEPTANE                             |
| 50 CYCLOHEXENE            | 0.3              |                                                 |            | 1015000 |         |                                        |
| 51 DIBROMOMETHANE         | 18.4             |                                                 |            |         |         | METHYLENE DIBROMIDE; METHYLENE BROMIDE |
| 52 1,2-DICHLOROPROPANE    | 0.6              |                                                 |            |         |         | PROPYLENE CHLORIDE                     |
| 53 3-METHYLHEXANE         | 0.5              |                                                 |            |         |         |                                        |
| 54 2,3-DICHLOROPROPENE    | 0.7              |                                                 |            | 5000    | 50000   | 2,3-DICHLOROPROPYLENE                  |
| 55 TRICHLOROETHENE        | 0.3              | 85000 (1)                                       | 28000 (A)  | 270000  | 1080000 | TRICHLOROETHYLENE                      |
| 56 2,2,4-TRIMETHYLPENTANE | 0.2              |                                                 |            |         |         | ISOOCTANE                              |
| 57 1-HEPTENE              | 0.3              |                                                 |            |         |         |                                        |
| 58 HEPTANE                | 0.2              |                                                 |            | 1600000 | 2000000 | *n-HEPTANE*                            |
| 59 trans-2-HEPTENE        | 0.3              |                                                 |            |         |         |                                        |
| 60 METHYLCYCLOHEXANE      | 0.2              |                                                 |            | 1600000 | 2000000 | HEXAHYDROTOLUENE                       |
| 61 2,2-DIMETHYLHEXANE     | 0.2              |                                                 |            |         |         |                                        |
| 62 ETHYLCYCLOPENTANE      | 0.2              |                                                 |            |         |         |                                        |
| 63 4-METHYLCYCLOHEXENE    | 0.3              |                                                 |            |         |         |                                        |

Table 2 ctd.

## Characteristics of the Organics Measured by the Gas Chromatographic Systems of MAMU #2

All concentrations are in terms of  $\mu\text{g}/\text{m}^3$  (micrograms per cubic metre) Updated October 16, 1987

|                                  | Detection<br>Limits | Standards,<br>Guidelines<br>or<br>Provisional<br>Guidelines | Criterion | TWA     | STEL    | Alternate<br>Names                     |
|----------------------------------|---------------------|-------------------------------------------------------------|-----------|---------|---------|----------------------------------------|
| 64 2,5-DIMETHYLHEXANE            | 0.5                 |                                                             |           |         |         |                                        |
| 65 1-CHLOROPENTANE               | 0.4                 |                                                             |           |         |         |                                        |
| 66 1,1,2-TRICHLOROETHANE         | 1.1                 |                                                             |           |         |         | n-AMYL CHLORIDE; PENTYL CHLORIDE       |
| 67 2,3,4-TRIMETHYLPENTANE        | 0.2                 |                                                             |           |         |         | VINYL TRICHLORIDE                      |
| 68 TOLUENE                       | 0.2                 | 2000 (1)                                                    | 2000 (A)  | 375000  | 560000  | *METHYLBENZENE*; PHENYLMETHANE         |
| 69 1,3-DICHLOROPROPANE           | 0.7                 |                                                             |           | 350000  | 510000  | TRIMETHYLENE CHLORIDE                  |
| 70 2-METHYLHEPTANE               | 0.2                 |                                                             |           |         |         |                                        |
| 71 4-METHYLHEPTANE               | 0.2                 |                                                             |           |         |         |                                        |
| 72 c-1,3-DIMETHYLCYCLOHEXANE     | 0.2                 |                                                             |           |         |         |                                        |
| 73 3-METHYLHEPTANE               | 0.2                 |                                                             |           |         |         |                                        |
| 74 1,2-DIBROMOETHANE             | 2.1                 |                                                             |           |         |         | ETHYLENE DIBROMIDE; ETHYLENE BROMIDE   |
| 75 1,1-DIMETHYLCYCLOHEXANE       | 0.3                 |                                                             |           |         |         |                                        |
| 76 1-OCTENE                      | 0.4                 | 150000 (3)                                                  | 50000 (A) |         |         |                                        |
| 77 trans-1,2-DIMETHYLCYCLOHEXANE | 0.3                 |                                                             |           |         |         | *trans-1,2-DIMETHYLCYCLOHEXANE         |
| 78 trans-4-OCTENE                | 0.3                 |                                                             |           |         |         |                                        |
| 79 TETRACHLOROETHENE             | 0.9                 | 10000 (2)                                                   | 4000 (A)  | 335000  | 1340000 | TETRACHLOROETHYLENE; PERCHLOROETHYLENE |
| 80 c-1,4-DIMETHYLCYCLOHEXANE     | 0.3                 |                                                             |           |         |         |                                        |
| 81 OCTANE                        | 0.3                 | 45400 (3)                                                   | 15300 (A) | 1450000 | 1800000 | *n-OCTANE*                             |
| 82 trans-2-OCTENE                | 0.6                 |                                                             |           |         |         |                                        |
| 83 cis-1,2-DIMETHYLCYCLOHEXANE   | 0.2                 |                                                             |           |         |         |                                        |
| 84 CHLOROBENZENE                 | 0.4                 |                                                             |           | 350000  |         | PHENYL CHLORIDE                        |

Table 2 ctd.

## Characteristics of the Organics Measured by the Gas Chromatographic Systems of MAMU #2

All concentrations are in terms of  $\mu\text{g}/\text{m}^3$  (micrograms per cubic metre) Updated October 16, 1987

|                              | Detection Limits | Standards, Guidelines or Provisional Guidelines | Criterion | TWA     | STEL    | Alternate Names                                               |
|------------------------------|------------------|-------------------------------------------------|-----------|---------|---------|---------------------------------------------------------------|
|                              |                  |                                                 |           |         |         |                                                               |
| 85 ETHYLCYCLOHEXANE          | 0.1              |                                                 |           |         |         |                                                               |
| 86 1-CHLOROHXANE             | 0.5              |                                                 |           |         |         | n-HEXYL CHLORIDE                                              |
| 87 ETHYLBENZENE              | 0.3              | 4000 (1)                                        | 4000 (B)  | 435000  | 545000  |                                                               |
| 88 m,p-XYLENES               | 0.3              | 2300 (4)                                        | 2300 (A)  | 435000  | 655000  | *1,3-DIMETHYLBENZENE*                                         |
| 89 4-METHYLOCTANE            | 0.3              |                                                 |           |         |         |                                                               |
| 90 2-METHYLOCTANE            | 0.3              |                                                 |           |         |         |                                                               |
| 91 3-METHYLOCTANE            | 0.3              |                                                 |           |         |         |                                                               |
| 92 STYRENE                   | 0.5              | 400 (1)                                         | 400 (A)   | 215000  | 25000   | *ETHYLBENZENE*; *HENYLETHYLENE; VINYL BENZENE                 |
| 93 1,4-DICHLOROBUTANE        | 0.3              |                                                 |           |         |         |                                                               |
| 94 o-XYLENE                  | 0.3              | 2300 (4)                                        | 2300 (A)  | 435000  | 655000  | *1,2-DIMETHYLBENZENE*                                         |
| 95 1,1,2,2-TETRACHLOROETHANE | 2.6              |                                                 |           |         |         | ACETYLENE TETRACHLORIDE                                       |
| 96 1,2,3-TRICHLOROPROPANE    | 1.3              |                                                 |           | 300000  | 450000  | TRICHLOROETHYRIN                                              |
| 97 1-NONENE                  | 0.7              |                                                 |           |         |         |                                                               |
| 98 trans-1,4-DICL-2-BUTENE   | 0.9              |                                                 |           |         |         |                                                               |
| 99 NONANE                    | 0.3              |                                                 |           | 1050000 | 1300000 | *n-NONANE*                                                    |
| 100 ISOPROPYLBENZENE         | 0.3              | 100 (3)                                         | 100 (B)   |         |         | *1-METHYLETHYL BENZENE*; CUMENE                               |
| 101 2-CHLOROTOLUENE          | 0.3              |                                                 |           |         |         | *2-CHLORO-1-METHYLBENZENE*; o-TOLYL CHLORIDE; o-CHLOROTOLUENE |
| 102 3-CHLOROTOLUENE          | 0.5              |                                                 |           |         |         | *3-CHLORO-1-METHYLBENZENE*; m-TOLYL CHLORIDE; m-CHLOROTOLUENE |
| 103 4-CHLOROTOLUENE          | 0.5              |                                                 |           |         |         | *4-CHLORO-1-METHYLBENZENE; p-TOLYL CHLORIDE; p-CHLOROTOLUENE  |
| 104 PROPYLENE                | 0.4              |                                                 |           |         |         | n-PROPYLBENZENE                                               |
| 105 3-ETHYLTOLUENE           | 0.3              |                                                 |           |         |         | *1-ETHYL-3-METHYLBENZENE*; m-ETHYLTOLUENE                     |

Table 2 ctd.

## Characteristics of the Organics Measured by the Gas Chromatographic Systems of MANU #2

All concentrations are in terms of  $\mu\text{g}/\text{m}^3$  (micrograms per cubic metre)

Updated October 16, 1987

| Detection Limits             | Standards, Guidelines<br>OR<br>Provisional Guidelines | Criterion | TWA       | STEL   | Alternate Names                                              |
|------------------------------|-------------------------------------------------------|-----------|-----------|--------|--------------------------------------------------------------|
|                              |                                                       |           |           |        |                                                              |
| 106 4-ETHYLTOLUENE           | 0.3                                                   |           |           |        | *1-ETHYL-4-METHYLBENZENE*; P-ETHYLTOLUENE                    |
| 107 1,3,5-TRIMETHYLBENZENE   | 0.4                                                   |           |           |        | MESITYLENE                                                   |
| 108 2-ETHYLTOLUENE           | 0.3                                                   |           | 125000    | 170000 | *1-ETHYL-2-METHYLBENZENE*; O-ETHYLTOLUENE                    |
| 109 1,2,4-TRIMETHYLBENZENE   | 0.4                                                   |           |           |        | PSUEDOCUMENE                                                 |
| 110 tert. BUTYLBENZENE       | 0.3                                                   |           | 1000 (A)  | 170000 | *(1,1-DIMETHYLETHYL)BENZENE*                                 |
| 111 tert. BUTYLCYCLOHEXANE   | 0.4                                                   |           |           |        |                                                              |
| 112 1,3-DICHLOROBENZENE      | 0.8                                                   |           |           |        |                                                              |
| 113 1-DECENE                 | 1.3                                                   |           |           |        | n-DECYLENE                                                   |
| 114 (CHLOROMETHYL)BENZENE    | 4.3                                                   |           |           |        | alpha-CHLOROTOLUENE; BENZYL CHLORIDE                         |
| 115 1,5-DICHLOROPENTANE      | 0.3                                                   |           | 60000 (A) |        |                                                              |
| 116 isobUTYLBENZENE          | 0.3                                                   |           |           |        |                                                              |
| 117 DECANE                   | 0.5                                                   |           |           |        | *n-DECANE*                                                   |
| 118 sec. BUTYLBENZENE        | 0.2                                                   |           |           |        | *(: METHYLPROPYL)BENZENE*                                    |
| 119 3-(CHLOROMETHYL)HEPTANE  | 0.3                                                   |           |           |        |                                                              |
| 120 1,2,3-TRIMETHYLBENZENE   | 0.4                                                   |           |           |        | HEMIMELLITENE                                                |
| 121 1ISOPROPYL4METHYLBENZENE | 0.5                                                   |           |           |        | *METHYL(4-METHYLETHYL)BENZENE*; 3-ISOPROPYLTOLUENE; P-CYMENE |
| 122 1,2-DICHLOROBENZENE      | 0.3                                                   |           | 125000    | 175000 | O-DICHLOROBENZENE                                            |
| 123 INDAN                    | 0.5                                                   |           |           |        | *2,3-DIHYDRO-1H-INDENE*; 2,3-DIHYDROINDENE; HYDRINDENE       |
| 124 BUTYLCYCLOHEXANE         | 0.4                                                   |           |           |        | n-BUTYLCYCLOHEXANE; 1-CYCLOHEXYLEUTANE                       |
| 125 1,3-DIETHYLBENZENE       | 0.4                                                   |           |           |        | m-DIETHYLBENZENE                                             |
| 126 1,4-DIETHYLBENZENE       | 0.5                                                   |           |           |        | p-DIETHYLBENZENE                                             |

Table 2 ctd.

## Characteristics of the Organics Measured by the Gas Chromatographic Systems of MAMU #2

All concentrations are in terms of  $\mu\text{g}/\text{m}^3$  (micrograms per cubic metre) Updated October 16, 1987

|                                | Detection Limits | Standards, Guidelines        | Criterion | TWA | STEL | Alternate Names                                  |
|--------------------------------|------------------|------------------------------|-----------|-----|------|--------------------------------------------------|
|                                |                  | or<br>Provisional Guidelines |           |     |      |                                                  |
| 127 BUTYLBENZENE               | 0.3              |                              |           |     |      | n-BUTYLBENZENE                                   |
| 128 1,2-DIETHYLBENZENE         | 0.5              |                              |           |     |      | O-DIETHYLBENZENE                                 |
| 129 trans-DECAHYDRONAPHTHALENE | 0.3              |                              |           |     |      | t-DECALIN; BICYCLO[4,4,0]DECANE                  |
| 130 cis-DECAHYDRONAPHTHALENE   | 0.3              |                              |           |     |      | c-DECALIN; BICYCLO[4,4,0]DECANE                  |
| 131 UNDECANE                   | 0.8              |                              |           |     |      | *n-UNDECANE*; HENDECANE                          |
| 132 1235-TETRAMETHYLBENZENE    | 0.6              |                              |           |     |      | ISODURENE                                        |
| 133 1234-TETRAMETHYLBENZENE    | 0.6              |                              |           |     |      | PREHNITENE                                       |
| 134 1,3-DIISOPROPYLBENZENE     | 0.8              |                              |           |     |      | *1,3-BIS(1-METHYLETHYL)BENZENE*                  |
| 135 1234TETRAHYDRONAPHTHALENE  | 0.6              |                              |           |     |      | TETRALIN                                         |
| 136 1,4-DIISOPROPYLBENZENE     | 0.8              |                              |           |     |      | *1,4-BIS(1-METHYLETHYL)BENZENE*; ISOPROPYLCUMENE |
| 137 NAPHTHALENE                | 0.8              | 36 (3)                       | 22.5 (A)  |     |      |                                                  |
| 138 DODECANE                   | 1.3              |                              |           |     |      | *n-DODECANE*                                     |

Table 2 ctd.

Characteristics of the Organics Measured by the Gas Chromatographic Systems of MANU #2

All concentrations are in terms of  $\mu\text{g}/\text{m}^3$  (micrograms per cubic metre)

Updated October 16, 1987

| Detection Limits | Standards, Guidelines or Provisional Guidelines | Criterion | TWA | STEL | Alternate Names |
|------------------|-------------------------------------------------|-----------|-----|------|-----------------|
|------------------|-------------------------------------------------|-----------|-----|------|-----------------|

NOTES:

- (1) Standard
- (2) Guideline
- (3) Provisional Guideline
- (4) Standard for the sum of o-, m-, & p- Xylenes

- (A) Ambient Air Quality Criterion based on a 24-hour average concentration
- (B) Ambient Air Quality Criterion based on a 1-hour average concentration (please note; if the maximum 1-hour average concentration of a contaminant is LESS than the Criterion concentration based on a 24-hour average, then that Criterion has NOT been exceeded.)

TWA - Time Weighted Average for a normal 8-hour workday and a 40-hour workweek, to which nearly all workers may be repeatedly exposed without adverse effect.

STEL - Short Term Exposure Limit - concentration to which workers can be exposed for a short period of time (15 minutes) without adverse effect.

\* - Denotes name approved by the International Union of Pure and Applied Chemistry (IUPAC).

Table 2 ctd.

## Characteristics of the Common Contaminants as Measured Continuously by MANU #2

All concentrations are in terms of ppm (parts per million)

|                         | Detection Limits | Standards, Guidelines or Provisional Guidelines | Criterion | TWA | STEL | Alternate Names |
|-------------------------|------------------|-------------------------------------------------|-----------|-----|------|-----------------|
|                         |                  |                                                 |           |     |      |                 |
| 1 SULPHUR DIOXIDE       | 0.005            | 0.300                                           | 0.25      | 2   | 5    | S02             |
| 2 TOTAL REDUCED SULPHUR | 0.005            | 0.027 *                                         | 0.027     | 10  | 15   | TRS             |
| 3 NITROGEN OXIDES       | 0.01             | 0.25 ***                                        | N/A       | -   | -    | NOX             |
| 4 NITROGEN DIOXIDE      | 0.01             | N/A                                             | 0.20      | 5   | 5    | NO2             |
| 5 NITRIC OXIDE          | 0.01             | N/A                                             | N/A       | 25  | 35   | NO              |
| 6 OZONE                 | 0.01             | 0.1                                             | 0.08      | 0.1 | 0.3  | O3              |
| 7 CARBON MONOXIDE       | 0.1              | 5.0                                             | 30.0      | 50  | 400  | CO              |

\* As equivalent H2S and applicable only for Kraft Pulp Mills

TRS may contain any of the following: Hydrogen Sulphide (H2S), Methyl Mercaptan (CH3SH), Dimethyl Sulphide (C2H6S) and Dimethyl Disulphide (C2H6S2).

\*\* The TWA and STEL for TRS is expressed solely for Hydrogen Sulphide concentrations

\*\*\* Expressed as NO2

S = Standard; G = Guideline; P = Provisional Guideline

Table 3

## Surface Analysis -- Buffalo, New York

--- Date: 87/10/08 00:00 ---

| ID     | HR | CNT | TY | SKY | AMT   | VIS | PREC | PRES  | TEM | DEW | WIND | GU | CLOUD |
|--------|----|-----|----|-----|-------|-----|------|-------|-----|-----|------|----|-------|
| BUF 00 | 00 | 101 | SA | S   | S O   | 25  | ..   | 10074 | 9   | 6   | 2309 |    |       |
| BUF 01 | 01 | 1   | SA | S   | O     | 25  | ..   | 10084 | 8   | 4   | 2710 |    |       |
| BUF 02 | 02 | 1   | SA | B   | O     | 10  | R-   | 10089 | 8   | 5   | 2710 |    |       |
| BUF 03 | 03 | 1   | SA | O   |       | 15  | R-   | 10093 | 8   | 6   | 2609 |    |       |
| BUF 04 | 04 | 1   | SA | S   | O     | 20  | ..   | 10095 | 8   | 6   | 2407 |    |       |
| BUF 05 | 05 | 1   | SA | S   | O     | 20  | ..   | 10095 | 8   | 6   | 2508 |    |       |
| BUF 06 | 06 | 101 | SA | O   |       | 25  | ..   | 10095 | 7   | 6   | 2608 |    |       |
| BUF 07 | 07 | 11  | SA | S   | S     | 25  | ..   | 10098 | 7   | 5   | 2609 |    |       |
| BUF 08 | 08 | 11  | SA | S   | O     | 15  | ..   | 10101 | 6   | 5   | 2609 |    |       |
| BUF 09 | 09 | 11  | SA | S   | S O   | 15  | RW-  | 10108 | 7   | 6   | 2708 |    |       |
| BUF 10 | 10 | 1   | SA | S   | B O   | 10  | RW-  | 10119 | 7   | 6   | 3308 |    |       |
| BUF 11 | 11 | 1   | RS | S   | B O   | 15  | RW-  | 10129 | 6   | 4   | 3108 |    |       |
| BUF 12 | 12 | 101 | SA | S   | O     | 25  | RW-  | 10140 | 6   | 4   | 3310 |    |       |
| BUF 13 | 13 | 1   | SA | S   | S B B | 25  | ..   | 10155 | 6   | 4   | 3212 |    |       |
| BUF 14 | 14 | 1   | SA | S   | O     | 25  | ..   | 10164 | 7   | 3   | 3014 | 18 |       |
| BUF 15 | 15 | 1   | SA | S   | B     | 25  | ..   | 10172 | 7   | 3   | 3210 |    |       |
| BUF 16 | 16 | 1   | SA | S   | S B   | 25  | RW-  | 10179 | 7   | 2   | 3110 |    |       |
| BUF 17 | 17 | 1   | SA | S   | B B   | 20  | RW-  | 10184 | 6   | 3   | 3012 |    |       |
| BUF 18 | 18 | 200 |    |     |       |     |      | 10188 | 7   | 3   | 3111 |    |       |
| BUF 19 | 19 | 1   | SA | S   | S B   | 25  | ..   | 10190 | 8   | 1   | 2914 | 19 |       |
| BUF 20 | 20 | 1   | SA | S   | B     | 25  | ..   | 10199 | 8   | -1  | 2813 | 20 |       |
| BUF 21 | 21 | 1   | SA | S   | B     | 25  | ..   | 10205 | 9   | 0   | 2914 |    |       |
| BUF 22 | 22 | 1   | SA | S   | B     | 25  | ..   | 10212 | 8   | 0   | 3014 |    |       |
| BUF 23 | 23 | 1   | SA | S   | O     | 30  | ..   | 10219 | 7   | -1  | 2912 |    |       |

In the above surface analysis weather synopsis as reported by the Buffalo weather office on the universal 2322 form.

The atmospheric pressure is reported in tens of kilopascals; temperature and dew point temperatures are in degrees Celsius; and the wind is reported as XXyy where XX is the direction from which the wind is blowing (in tens of degrees true) and yy is the wind speed in knots (kts).

Table 3 ctd.

## Surface Analysis -- Buffalo, New York

--- Date: 87/10/09 00:00 ---

| ID     | HR  | CNT | TY | SKYAMT | VIS | PREC | PRES  | TEM | DEW | WIND | GU | CLOUD |
|--------|-----|-----|----|--------|-----|------|-------|-----|-----|------|----|-------|
| BUF 00 | 101 | SA  | S  | O      | 30  | ..   | 10230 | 7   | -1  | 3010 |    |       |
| BUF 01 | 1   | SA  | S  | B      | 30  | ..   | 10240 | 6   | -1  | 2909 |    |       |
| BUF 02 | 1   | SA  | B  |        | 30  | ..   | 10244 | 6   | 0   | 2909 |    |       |
| BUF 03 | 1   | SA  | O  |        | 30  | ..   | 10251 | 6   | -1  | 3008 |    |       |
| BUF 04 | 1   | SA  | B  |        | 30  | ..   | 10251 | 5   | -2  | 2908 |    |       |
| BUF 05 | 1   | SA  | B  |        | 30  | ..   | 10254 | 4   | -2  | 3010 |    |       |
| BUF 06 | 101 | SA  | B  |        | 30  | ..   | 10254 | 4   | -3  | 2605 |    |       |
| BUF 07 | 1   | SA  | B  |        | 30  | ..   | 10257 | 4   | -3  | 1904 |    |       |
| BUF 08 | 1   | SA  | O  |        | 30  | ..   | 10254 | 4   | -2  | 1405 |    |       |
| BUF 09 | 1   | SA  | B  |        | 30  | ..   | 10254 | 4   | 0   | 1606 |    |       |
| BUF 10 | 1   | SA  | B  | O      | 30  | ..   | 10261 | 5   | 2   | 1808 |    |       |
| BUF 11 | 1   | SA  | S  | S B    | 25  | ..   | 10257 | 6   | 1   | 1806 |    |       |
| BUF 12 | 102 | SA  | B  |        | 25  | ..   | 10257 | 6   | 1   | 1908 |    |       |
| BUF 13 | 1   | SA  | S  | B      | 30  | ..   | 10251 | 7   | 0   | 2112 |    |       |
| BUF 14 | 1   | SA  | O  |        | 30  | ..   | 10251 | 7   | 0   | 2012 | 17 |       |
| BUF 15 | 1   | SA  | O  |        | 30  | ..   | 10247 | 9   | 1   | 1914 | 20 |       |
| BUF 16 | 1   | SA  | O  |        | 25  | ..   | 10243 | 11  | 1   | 2017 | 22 |       |
| BUF 17 | 1   | SA  | S  | O      | 25  | ..   | 10233 | 11  | 1   | 2017 | 23 |       |
| BUF 18 | 101 | SA  | S  | O      | 20  | RW-  | 10222 | 11  | 2   | 2114 | 21 |       |
| BUF 19 | 1   | SA  | S  | O      | 20  | ..   | 10215 | 11  | 2   | 2215 | 22 |       |
| BUF 20 | 1   | SA  | S  | S B O  | 20  | ..   | 10201 | 12  | 2   | 2117 | 25 |       |
| BUF 21 | 1   | SA  | -S |        | 25  | ..   | 10194 | 13  | 1   | 2218 | 26 |       |
| BUF 22 | 1   | SA  | -S |        | 25  | ..   | 10190 | 13  | 0   | 2118 | 27 |       |
| BUF 23 | 1   | SA  | -S |        | 25  | ..   | 10201 | 12  | 1   | 2212 |    |       |

Table 3 ctd.

## Surface Analysis -- Buffalo, New York

--- Date: 87/10/10 00:00 ---

| ID     | HR | CNT | TY | SKYAMT | VIS | PREC | PRES  | TEM | DEW | WIND | GU | CLOUD |
|--------|----|-----|----|--------|-----|------|-------|-----|-----|------|----|-------|
| BUF 00 | 00 | 101 | SA | -S     | 25  | ..   | 10215 | 12  | 2   | 2313 |    |       |
| BUF 01 | 01 | 1   | SA | S B B  | 25  | ..   | 10224 | 12  | 2   | 2212 |    |       |
| BUF 02 | 02 | 1   | SA | S S-O  | 25  | ..   | 10228 | 12  | 3   | 2212 |    |       |
| BUF 03 | 03 | 1   | SA | S S-B  | 25  | ..   | 10228 | 11  | 3   | 2110 |    |       |
| BUF 04 | 04 | 1   | SA | S S O  | 25  | ..   | 10230 | 12  | 3   | 2311 |    |       |
| BUF 05 | 05 | 1   | SA | S S O  | 20  | ..   | 10234 | 13  | 7   | 2809 |    |       |
| BUF 06 | 06 | 101 | SA | S O    | 20  | ..   | 10241 | 12  | 6   | 3012 |    |       |
| BUF 07 | 07 | 1   | SA | S O    | 20  | ..   | 10249 | 10  | 5   | 3207 |    |       |
| BUF 08 | 08 | 1   | SA | B O    | 25  | ..   | 10255 | 9   | 4   | 3104 |    |       |
| BUF 09 | 09 | 1   | SA | S O    | 30  | ..   | 10260 | 9   | 3   | 2706 |    |       |
| BUF 10 | 10 | 1   | SA | S O    | 30  | ..   | 10267 | 9   | 3   | 3008 |    |       |
| BUF 11 | 11 | 1   | SA | S O    | 30  | ..   | 10271 | 8   | 4   | 3207 |    |       |
| BUF 12 | 12 | 1   | SA | S B O  | 30  | ..   | 10275 | 8   | 4   | 3104 |    |       |
| BUF 13 | 13 | 1   | SA | S B O  | 30  | ..   | 10282 | 8   | 4   | 3008 |    |       |
| BUF 14 | 14 | 1   | SA | S B O  | 35  | ..   | 10296 | 9   | 4   | 3010 |    |       |
| BUF 15 | 15 | 11  | SA | S B O  | 35  | ..   | 10299 | 9   | 3   | 3109 |    |       |
| BUF 16 | 16 | 1   | SA | S S B  | 40  | ..   | 10303 | 9   | 3   | 3308 |    |       |
| BUF 17 | 17 | 1   | SA | S S    | 40  | ..   | 10305 | 10  | 3   | 3009 |    |       |
| BUF 18 | 18 | 101 | SA | B B    | 40  | ..   | 10303 | 9   | 3   | 3412 |    |       |
| BUF 19 | 19 | 1   | SA | S O    | 40  | ..   | 10296 | 8   | 3   | 3508 |    |       |
| BUF 20 | 20 | 1   | SA | S O    | 35  | ..   | 10300 | 8   | 3   | 3508 |    |       |
| BUF 21 | 21 | 1   | SA | S O    | 35  | ..   | 10304 | 8   | 2   | 3306 |    |       |
| BUF 22 | 22 | 1   | SA | B O    | 35  | ..   | 10300 | 7   | 1   | 3605 |    |       |
| BUF 23 | 23 | 1   | SA | S B O  | 30  | ..   | 10300 | 7   | 1   | 0205 |    |       |

Table 3 ctd.

## Surface Analysis -- Buffalo, New York

--- Date: 87/10/12 00:00 ---

| ID     | HR  | CNT | TY | SKYAMT  | VIS | PREC | PRES  | TEM | DEW | WIND | GU | CLOUD |
|--------|-----|-----|----|---------|-----|------|-------|-----|-----|------|----|-------|
| BUF 00 |     | 1   | SA | S O     | 25  | ..   | 10255 | 6   | 3   | 0803 |    |       |
| BUF 01 |     | 1   | SA | S O     | 25  | ..   | 10255 | 6   | 3   | 0903 |    |       |
| BUF 02 |     | 1   | SA | O       | 25  | ..   | 10252 | 6   | 2   | 1606 |    |       |
| BUF 03 |     | 1   | SA | O       | 20  | ..   | 10252 | 6   | 3   | 1805 |    |       |
| BUF 04 |     | 1   | SA | O       | 20  | ..   | 10247 | 6   | 3   | 1604 |    |       |
| BUF 05 |     | 1   | SA | S O     | 20  | ..   | 10244 | 5   | 3   | 1806 |    |       |
| BUF 06 | 101 | 1   | SA | S O     | 20  | ..   | 10240 | 5   | 3   | 1605 |    |       |
| BUF 07 |     | 1   | SA | S O     | 25  | ..   | 10233 | 5   | 3   | 1605 |    |       |
| BUF 08 |     | 1   | SA | S O     | 25  | ..   | 10230 | 5   | 3   | 1604 |    |       |
| BUF 09 |     | 1   | SA | O       | 20  | ..   | 10223 | 4   | 3   | 1005 |    |       |
| BUF 10 |     | 1   | SA | O       | 20  | ..   | 10223 | 4   | 3   | 1706 |    |       |
| BUF 11 |     | 1   | SA | O       | 25  | ..   | 10219 | 4   | 3   | 1705 |    |       |
| BUF 12 | 101 | 1   | SA | O       | 20  | ..   | 10219 | 5   | 3   | 2007 |    |       |
| BUF 13 |     | 1   | CO | O       | 20  | ..   | 10219 | 5   | 3   | 1705 |    |       |
| BUF 14 |     | 1   | SA | O       | 25  | ..   | 10219 | 6   | 3   | 2004 |    |       |
| BUF 15 |     | 1   | SA | S S     | 30  | ..   | 10212 | 8   | 3   | 2407 |    |       |
| BUF 16 |     | 1   | SA | S S B   | 30  | ..   | 10205 | 11  | -1  | 2703 |    |       |
| BUF 17 |     | 1   | SA | S S B B | 30  | ..   | 10205 | 11  | -2  | 2807 |    |       |
| BUF 18 |     | 1   | SA | S B O   | 30  | ..   | 10198 | 10  | -1  | 2309 |    |       |
| BUF 19 |     | 1   | CO | S O     | 30  | ..   | 10195 | 9   | -1  | 2906 |    |       |
| BUF 20 |     | 1   | SA | S B O   | 30  | ..   | 10191 | 9   | 0   | 2509 |    |       |
| BUF 21 |     | 1   | SA | S B O   | 25  | ..   | 10191 | 8   | 1   | 2209 |    |       |
| BUF 22 |     | 1   | SA | S B B   | 25  | ..   | 10191 | 8   | 1   | 1907 |    |       |
| BUF 23 |     | 1   | SA | S S O   | 25  | ..   | 10195 | 7   | 1   | 2107 |    |       |

Table 4

Itinerary at the Occidental Chemical Corporation  
liquid hazardous waste incineration facility  
Niagara Falls, New York

Thursday, October 8:

|               |                                         |
|---------------|-----------------------------------------|
| 10:15 - 12:00 | Pretest of incinerator                  |
| 16:00         | NAPL waste feed introduced              |
| 16:35         | In-stack testing started                |
| 21:00         | Test completed & NAPL waste feed halted |

Friday, October 9:

|       |                            |
|-------|----------------------------|
| 10:30 | NAPL waste feed introduced |
| 10:50 | In-stack testing started   |
| 15:55 | Testing completed          |
| 16:00 | NAPL waste feed halted     |

Saturday, October 10:

|       |                            |
|-------|----------------------------|
| 10:05 | NAPL waste feed introduced |
| 10:25 | In-stack testing started   |
| 15:10 | Testing completed          |
| 15:20 | NAPL waste feed halted     |

Monday, October 12:

|       |                            |
|-------|----------------------------|
| 09:30 | NAPL waste feed introduced |
| 11:55 | In-stack testing started   |
| 16:07 | Testing completed          |
| 16:10 | NAPL waste feed stopped    |

Figure 2

Concentration/Time

# OCCIDENTAL\_87: M001

Start: 87/10/08 10:05 Scan: 300 sec. Ave: 60.00 min.  
 Loc: Merging of all data acquired at 2nd Intake...Niagara Falls

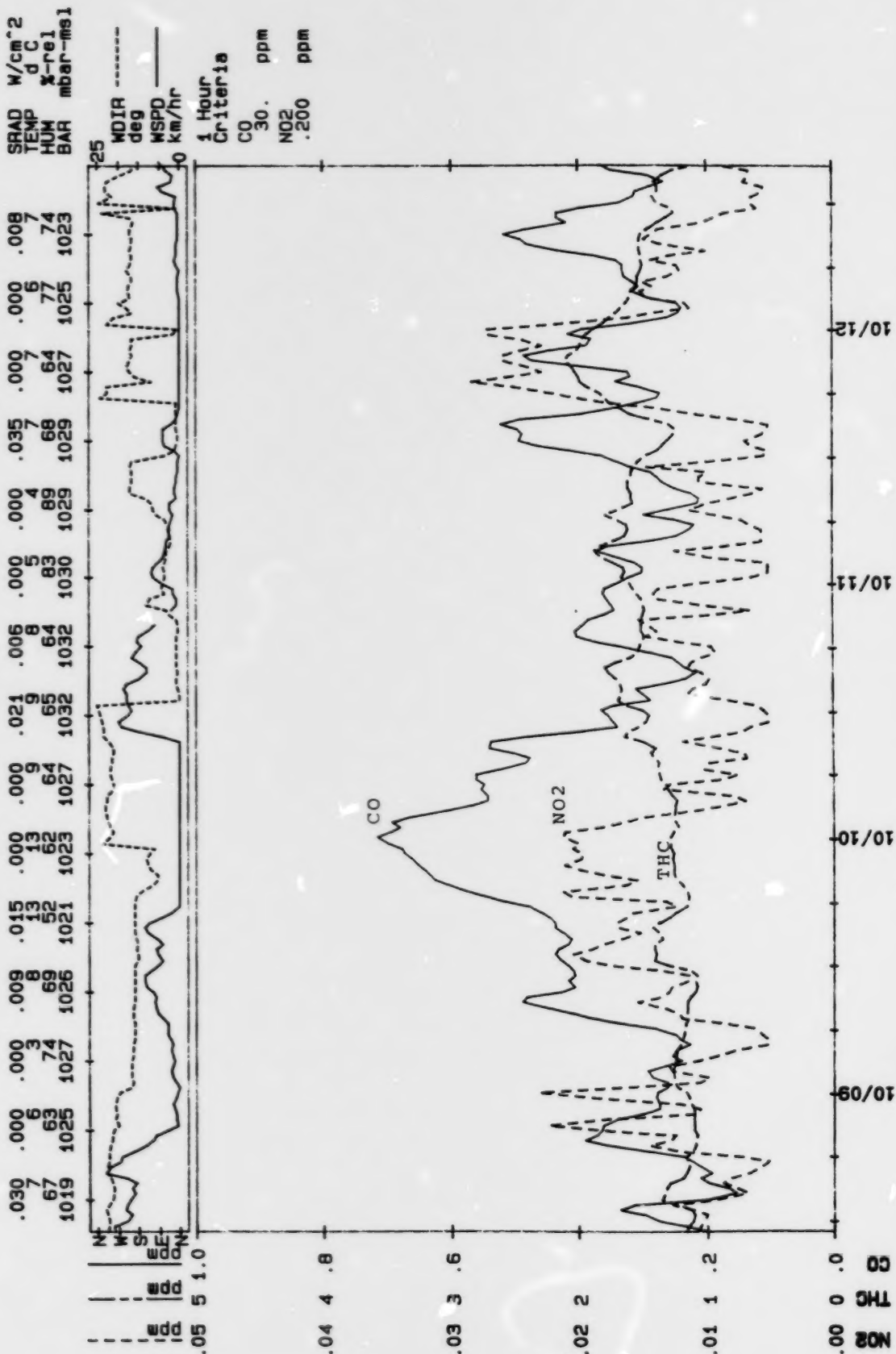


Table 5

## Occidental 1987 Air Quality Survey - VOC Analytical Results

| Sample Identification       | 88OCT 1  | 88OCT 2  | 88OCT 3  | 88OCT 4  | 89OCT 1  | 812OCT 1 |   |     |     |
|-----------------------------|----------|----------|----------|----------|----------|----------|---|-----|-----|
| Sample Start Time           | 10:11    | 12:58    | 16:23    | 18:22    | 11:28    | 11:20    |   |     |     |
| Duration                    | One-Hour | One-Hour | One-Hour | One-Hour | One-Hour | One-Hour |   |     |     |
| Analysis Start Time         | 11:19    | 14:06    | 17:31    | 19:30    | 12:36    | 12:28    |   |     |     |
| Sampling Date               | OCT 8    | OCT 8    | OCT 8    | OCT 8    | OCT 9    | OCT 12   |   |     |     |
|                             | COUNT    | AVERAGE  | MAXIMUM  |          |          |          |   |     |     |
| 1 PROPANE                   | 3.3      | 1.7      | 1.6      | 1.5      | 4.0      | 2.9      |   |     |     |
| 2 PROPADIENE                |          |          |          |          |          |          | 6 | 2.5 | 4.0 |
| 3 PROPYNE                   |          |          |          |          |          |          |   |     |     |
| 4 CYCLOPROPANE              |          |          |          |          |          |          |   |     |     |
| 5 2-METHYLPROPANE           | 9.8      | 1.6      | 1.7      | 0.8      | 1.5      | 1.6      | 6 | 2.8 | 9.8 |
| 6 CHLOROETHENE              |          |          |          |          |          |          |   |     |     |
| 7 1-BUTENE                  |          |          |          |          |          |          |   |     |     |
| 8 1,3-BUTADIENE             |          |          |          |          |          |          |   |     |     |
| 9 BUTANE                    | 3.1      | 2.7      | 2.0      | 2.2      | 4.4      | 4.2      | 6 | 3.1 | 4.4 |
| 10 1-BUTYNE                 |          |          |          |          |          |          |   |     |     |
| 11 CHLOROETHANE             |          |          |          |          |          |          |   |     |     |
| 12 3-METHYL-1-BUTENE        |          |          |          |          |          |          |   |     |     |
| 13 2-METHYLBUTANE           | 2.5      | 2.3      | 1.6      | 1.9      | 3.0      | 2.9      | 6 | 2.4 | 3.0 |
| 14 2-METHYL-1-BUTENE        |          |          |          |          |          |          |   |     |     |
| 15 PENTANE                  | 1.9      | 1.7      | 1.2      | 1.4      | 2.3      | 2.1      | 6 | 1.8 | 2.3 |
| 16 2-METHYL-1,3-BUTADIENE   |          |          |          |          |          |          |   |     |     |
| 17 trans-2-PENTENE          |          |          |          |          |          |          |   |     |     |
| 18 cis-2-PENTENE            |          |          |          |          |          |          |   |     |     |
| 19 DICHLOROMETHANE          |          |          |          |          |          |          |   |     |     |
| 20 2-METHYL-2-BUTENE        |          |          |          |          |          |          |   |     |     |
| 21 2,2-DIMETHYLBUTANE       |          |          |          |          |          |          |   |     |     |
| 22 trans-1,2-DICHLOROETHENE |          |          |          |          |          |          |   |     |     |
| 23 3-METHYL-1-PENTENE       |          |          |          |          |          |          |   |     |     |

Table 5 ctd.

## Occidental 1987 Air Quality Survey - VOC Analytical Results

| Sample Identification       | B8OCT 1  | B8OCT 2  | B8OCT 3  | B8OCT 4  | B9OCT 1  | B12OCT 1 |   |     |     |
|-----------------------------|----------|----------|----------|----------|----------|----------|---|-----|-----|
| Sample Start Time           | 10:11    | 12:58    | 16:23    | 18:22    | 11:28    | 11:20    |   |     |     |
| Duration                    | One-Hour | One-Hour | One-Hour | One-Hour | One-Hour | One-Hour |   |     |     |
| Analysis Start Time         | 11:19    | 14:06    | 17:31    | 19:30    | 12:36    | 12:28    |   |     |     |
| Sampling Date               | OCT 8    | OCT 8    | OCT 8    | OCT 8    | OCT 9    | OCT 12   |   |     |     |
|                             | COUNT    | AVERAGE  | MAXIMUM  |          |          |          |   |     |     |
| 24 4-METHYL-1-PENTENE       | 1.3      | 1.1      | 0.8      | 0.9      | 1.4      | 1.3      | 6 | 1.1 | 1.4 |
| 25 CYCLOPENTANE             |          |          |          |          |          |          |   |     |     |
| 26 2,3-DIMETHYLBUTANE       |          |          |          |          |          |          |   |     |     |
| 27 2-METHYLPENTANE          |          |          |          |          |          |          |   |     |     |
| 28 3-METHYLPENTANE          |          |          |          |          |          |          |   |     |     |
| 29 1-HEXENE                 |          |          |          |          |          |          |   |     |     |
| 30 cis-1,2-DICHLOROETHENE   |          |          |          |          |          |          |   |     |     |
| 31 2-CHLOROBUTANE           |          |          |          |          |          |          |   |     |     |
| 32 HEXANE                   | 1.2      | 1.0      | 0.8      | 0.9      | 1.3      | 1.3      | 6 | 1.1 | 1.3 |
| 33 1-CHLORO-2-METHYLPROPANE |          |          |          |          |          |          |   |     |     |
| 34 TRICHLOROMETHANE         |          |          |          |          |          |          |   |     |     |
| 35 trans-3-HEXENE           |          |          |          |          |          |          |   |     |     |
| 36 3-CHLORO-2-METHYLPROPENE |          |          |          |          |          |          |   |     |     |
| 37 METHYLCYCLOPENTANE       |          |          |          |          |          |          |   |     |     |
| 38 2,2-DIMETHYLPENTANE      |          |          |          |          |          |          |   |     |     |
| 39 1,2-DICHLOROETHANE       |          |          |          |          |          |          |   |     |     |
| 40 2,4-DIMETHYLPENTANE      |          |          |          |          |          |          |   |     |     |
| 41 1,1,1-TRICHLOROETHANE    |          |          |          |          |          |          |   |     |     |
| 42 2,2,3-TRIMETHYLBUTANE    |          |          |          |          |          |          |   |     |     |
| 43 1-CHLOROBUTANE           | 3.2      | 3.0      | 3.3      | 3.5      | 2.9      | 3.2      | 6 | 3.2 | 3.5 |
| 44 BENZENE                  |          |          |          |          |          |          |   |     |     |
| 45 TETRACHLOROMETHANE       |          |          |          |          |          |          |   |     |     |
| 46 3,3-DIMETHYLPENTANE      |          |          |          |          |          |          |   |     |     |
| 47 CYCLOHEXANE              |          |          |          |          |          |          |   |     |     |

Table 5 ctd.

## Occidental 1987 Air Quality Survey - VOC Analytical Results

| Sample Identification     | B8OCT 1  | B8OCT 2  | B8OCT 3  | B8OCT 4  | B9OCT 1  | B12OCT 1 |     |
|---------------------------|----------|----------|----------|----------|----------|----------|-----|
| Sample Start Time         | 10:11    | 12:58    | 16:23    | 18:22    | 11:28    | 11:20    |     |
| Duration                  | One-Hour | One-Hour | One-Hour | One-Hour | One-Hour | One-Hour |     |
| Analysis Start Time       | 11:19    | 14:06    | 17:31    | 19:30    | 12:36    | 12:28    |     |
| Sampling Date             | OCT 8    | OCT 8    | OCT 8    | OCT 8    | OCT 9    | OCT 12   |     |
|                           | COUNT    | AVERAGE  | MAXIMUM  |          |          |          |     |
| 48 2,3-DIMETHYLPENTANE    |          |          |          |          |          |          |     |
| 49 2-METHYLHEXANE         |          |          |          |          |          |          |     |
| 50 CYCLOHEXENE            |          |          |          |          |          |          |     |
| 51 DIBROMOMETHANE         |          |          |          |          |          |          |     |
| 52 1,2-DICHLOROPROPANE    |          |          |          |          |          |          |     |
| 53 3-METHYLHEXANE         |          |          |          |          |          |          |     |
| 54 2,3-DICHLOROPROPENE    |          |          |          |          |          |          |     |
| 55 TRICHLOROETHENE        |          |          |          |          |          |          |     |
| 56 2,2,4-TRIMETHYLPENTANE |          |          |          |          |          |          |     |
| 57 1-HEPTENE              |          |          |          |          |          |          |     |
| 58 HEPTANE                |          |          |          |          |          |          |     |
| 59 trans-2-HEPTENE        |          |          |          |          |          |          |     |
| 60 METHYLCYCLOHEXANE      |          |          |          |          |          |          |     |
| 61 2,2-DIMETHYLHEXANE     |          |          |          |          |          |          |     |
| 62 ETHYLCYCLOPENTANE      |          |          |          |          |          |          |     |
| 63 4-METHYLCYCLOHEXENE    |          |          |          |          |          |          |     |
| 64 2,5-DIMETHYLHEXANE     |          |          |          |          |          |          |     |
| 65 1-CHLOROPENTANE        |          |          |          |          |          |          |     |
| 66 1,1,2-TRICHLOROETHANE  |          |          |          |          |          |          |     |
| 67 2,3,4-TRIMETHYLPENTANE |          |          |          |          |          |          |     |
| 68 TOLUENE                | 3.2      | 2.9      | 2.4      | 3.6      | 2.4      | 2.4      |     |
| 69 1,3-DICHLOROPROPANE    |          |          |          |          |          |          | 2.8 |
| 70 2-METHYLHEPTANE        |          |          |          |          |          |          | 3.6 |
| 71 4-METHYLHEPTANE        |          |          |          |          |          |          |     |

Table 5 ctd.

## Occidental 1987 Air Quality Survey - VOC Analytical Results

| Sample Identification        | B8OCT 1  | B8OCT 2  | B8OCT 3  | B8OCT 4  | B9OCT 1  | B12OCT 1 |  | COUNT | AVERAGE | MAXIMUM |
|------------------------------|----------|----------|----------|----------|----------|----------|--|-------|---------|---------|
| Sample Start Time            | 10:11    | 12:58    | 16:23    | 18:22    | 11:28    | 11:20    |  |       |         |         |
| Duration                     | One-Hour | One-Hour | One-Hour | One-Hour | One-Hour | One-Hour |  |       |         |         |
| Analysis Start Time          | 11:19    | 14:06    | 17:31    | 19:30    | 12:36    | 12:28    |  |       |         |         |
| Sampling Date                | OCT 8    | OCT 8    | OCT 8    | OCT 8    | OCT 9    | OCT 12   |  |       |         |         |
| 72 c-1,3-DIMETHYLCYCLOHEXANE |          |          |          |          |          |          |  |       |         |         |
| 73 3-METHYLHEPTANE           |          |          |          |          |          |          |  |       |         |         |
| 74 1,2-DIBROMOETHANE         |          |          |          |          |          |          |  |       |         |         |
| 75 1,1-DIMETHYLCYCLOHEXANE   |          |          |          |          |          |          |  |       |         |         |
| 76 1-OCTENE                  |          |          |          |          |          |          |  |       |         |         |
| 77 trans12DIMETHYLCYCLOHEXAN |          |          |          |          |          |          |  |       |         |         |
| 78 trans-4-OCTENE            |          |          |          |          |          |          |  |       |         |         |
| 79 TETRACHLOROETHENE         |          |          |          |          |          |          |  |       |         |         |
| 80 c-1,4-DIMETHYLCYCLOHEXANE |          |          |          |          |          |          |  |       |         |         |
| 81 OCTANE                    |          |          |          |          |          |          |  |       |         |         |
| 82 trans-2-OCTENE            |          |          |          |          |          |          |  |       |         |         |
| 83 cis12DIMETHYLCYCLOHEXANE  |          |          |          |          |          |          |  |       |         |         |
| 84 CHLOROBENZENE             |          |          |          |          |          |          |  |       |         |         |
| 85 ETHYLCYCLOHEXANE          |          |          |          |          |          |          |  |       |         |         |
| 86 1-CHLOROHXANE             |          |          |          |          |          |          |  |       |         |         |
| 87 ETHYLBENZENE              | 0.7      | 0.6      | 0.4      | 0.5      | 0.5      | 0.4      |  | 6     | 0.5     | 0.7     |
| 88 M,P-XYLENE                | 2.3      | 2.0      | 1.3      | 1.5      | 1.3      | 0.9      |  | 6     | 1.5     | 2.3     |
| 89 4-METHYLOCTANE            |          |          |          |          |          |          |  |       |         |         |
| 90 2-METHYLOCTANE            |          |          |          |          |          |          |  |       |         |         |
| 91 3-METHYLOCTANE            |          |          |          |          |          |          |  |       |         |         |
| 92 STYRENE                   |          |          |          |          |          |          |  |       |         |         |
| 93 1,4-DICHLOROBUTANE        |          |          |          |          |          |          |  |       |         |         |
| 94 O-XYLENE                  | 0.8      | 0.7      | 0.5      | 0.6      | 0.5      | 0.3      |  | 6     | 0.5     | 0.8     |
| 95 1,1,2,2-TETRACHLOROTHANE  |          |          |          |          |          |          |  |       |         |         |

Table 5 ctd.

## Occidental 1987 Air Quality Survey - VOC Analytical Results

| Sample Identification       |               |          |          |          |          |          |          |  |  |  |  |  |  | COUNT AVERAGE MAXIMUM |  |  |  |  |  |
|-----------------------------|---------------|----------|----------|----------|----------|----------|----------|--|--|--|--|--|--|-----------------------|--|--|--|--|--|
| Sample Start Time           | Duration      |          |          |          |          |          |          |  |  |  |  |  |  |                       |  |  |  |  |  |
| Analysis Start Time         | Sampling Date |          |          |          |          |          |          |  |  |  |  |  |  |                       |  |  |  |  |  |
|                             |               | B8OCT 1  | B8OCT 2  | B8OCT 3  | B8OCT 4  | B9OCT 1  | B12OCT 1 |  |  |  |  |  |  |                       |  |  |  |  |  |
|                             |               | 10:11    | 12:58    | 16:23    | 18:22    | 11:28    | 11:20    |  |  |  |  |  |  |                       |  |  |  |  |  |
|                             |               | One-Hour | One-Hour | One-Hour | One-Hour | One-Hour | One-Hour |  |  |  |  |  |  |                       |  |  |  |  |  |
|                             |               | 11:19    | 14:06    | 17:31    | 19:30    | 12:36    | 12:28    |  |  |  |  |  |  |                       |  |  |  |  |  |
|                             |               | OCT 8    | OCT 8    | OCT 8    | OCT 8    | OCT 9    | OCT 12   |  |  |  |  |  |  |                       |  |  |  |  |  |
| 96 1,2,3-TRICHLOROPROPANE   |               |          |          |          |          |          |          |  |  |  |  |  |  |                       |  |  |  |  |  |
| 97 1-NONENE                 |               |          |          |          |          |          |          |  |  |  |  |  |  |                       |  |  |  |  |  |
| 98 trans-1,4-DICL-2-BUTENE  |               |          |          |          |          |          |          |  |  |  |  |  |  |                       |  |  |  |  |  |
| 99 NONANE                   |               |          |          |          |          |          |          |  |  |  |  |  |  |                       |  |  |  |  |  |
| 100 ISOPROPYLBENZENE        |               |          |          |          |          |          |          |  |  |  |  |  |  |                       |  |  |  |  |  |
| 101 2-CHLOROTOLUENE         |               |          |          |          |          |          |          |  |  |  |  |  |  |                       |  |  |  |  |  |
| 102 3-CHLOROTOLUENE         |               |          |          |          |          |          |          |  |  |  |  |  |  |                       |  |  |  |  |  |
| 103 4-CHLOROTOLUENE         |               |          |          |          |          |          |          |  |  |  |  |  |  |                       |  |  |  |  |  |
| 104 PROPYLBENZENE           |               |          |          |          |          |          |          |  |  |  |  |  |  |                       |  |  |  |  |  |
| 105 3-ETHYLTOLUENE          |               | 0.6      | 0.6      | 0.4      | 0.5      |          |          |  |  |  |  |  |  |                       |  |  |  |  |  |
| 106 4-ETHYLTOLUENE          |               |          |          |          |          |          |          |  |  |  |  |  |  |                       |  |  |  |  |  |
| 107 1,3,5-TRIMETHYLBENZENE  |               |          |          |          |          |          |          |  |  |  |  |  |  |                       |  |  |  |  |  |
| 108 2-ETHYLTOLUENE          |               |          |          |          |          |          |          |  |  |  |  |  |  |                       |  |  |  |  |  |
| 109 tert.BUTYLBENZENE       |               |          |          |          |          |          |          |  |  |  |  |  |  |                       |  |  |  |  |  |
| 110 1,2,4-TRIMETHYLBENZENE  |               |          |          |          |          |          |          |  |  |  |  |  |  |                       |  |  |  |  |  |
| 111 tert.BUTYLCYCLOHEXANE   |               |          |          |          |          |          |          |  |  |  |  |  |  |                       |  |  |  |  |  |
| 112 1,3-DICHLOROBENZENE     |               | 0.9      | 0.8      | 0.5      | 0.6      | 0.4      |          |  |  |  |  |  |  |                       |  |  |  |  |  |
| 113 (CHLOROMETHYL)BENZENE   |               |          |          |          |          |          |          |  |  |  |  |  |  |                       |  |  |  |  |  |
| 114 1-DECENE                |               |          |          |          |          |          |          |  |  |  |  |  |  |                       |  |  |  |  |  |
| 115 1,5-DICHLOROPENTANE     |               |          |          |          |          |          |          |  |  |  |  |  |  |                       |  |  |  |  |  |
| 116 isobUTYLBENZENE         |               |          |          |          |          |          |          |  |  |  |  |  |  |                       |  |  |  |  |  |
| 117 sec.BUTYLBENZENE        |               |          |          |          |          |          |          |  |  |  |  |  |  |                       |  |  |  |  |  |
| 118 DECANE                  |               |          |          |          |          |          |          |  |  |  |  |  |  |                       |  |  |  |  |  |
| 119 3-(CHLOROMETHYL)HEPTANE |               |          |          |          |          |          |          |  |  |  |  |  |  |                       |  |  |  |  |  |

Table 5 ctd.

## Occidental 1987 Air Quality Survey - VOC Analytical Results

| Sample Identification          | B8OCT 1  | B8OCT 2  | B8OCT 3  | B8OCT 4  | B9OCT 1  | B12OCT 1 |   |     |     |
|--------------------------------|----------|----------|----------|----------|----------|----------|---|-----|-----|
| Sample Start Time              | 10:11    | 12:58    | 16:23    | 18:22    | 11:28    | 11:20    |   |     |     |
| Duration                       | One-Hour | One-Hour | One-Hour | One-Hour | One-Hour | One-Hour |   |     |     |
| Analysis Start Time            | 11:19    | 14:06    | 17:31    | 19:30    | 12:36    | 12:28    |   |     |     |
| Sampling Date                  | OCT 8    | OCT 8    | OCT 8    | OCT 8    | OCT 9    | OCT 12   |   |     |     |
|                                | COUNT    | AVERAGE  | MAXIMUM  |          |          |          |   |     |     |
| 120 1,2,3-TRIMETHYLBENZENE     |          |          |          |          |          |          |   |     |     |
| 121 1-ISOPROPYL4-METHYLBENZENE |          |          |          |          |          |          |   |     |     |
| 122 1,2-DICHLOROBENZENE        |          |          |          |          |          |          |   |     |     |
| 123 INDAN                      |          |          |          |          |          |          |   |     |     |
| 124 BUTYLCYCLOHEXANE           |          |          |          |          |          |          |   |     |     |
| 125 1,3-DIETHYLBENZENE         |          |          |          |          |          |          |   |     |     |
| 126 1,4-DIETHYLBENZENE         |          |          |          |          |          |          |   |     |     |
| 127 BUTYLBENZENE               |          |          |          |          |          |          |   |     |     |
| 128 1,2-DIETHYLBENZENE         |          |          |          |          |          |          |   |     |     |
| 129 trans-DECAHYDRONAPHTHALENE |          |          |          |          |          |          |   |     |     |
| 130 cis-DECAHYDRONAPHTHALENE   |          |          |          |          |          |          |   |     |     |
| 131 UNDECANE                   |          |          |          |          |          |          |   |     |     |
| 132 1235-TETRAMETHYLBENZENE    |          |          |          |          |          |          |   |     |     |
| 133 1234-TETRAMETHYLBENZENE    |          |          |          |          |          |          |   |     |     |
| 134 1,3-DIISOPROPYLBENZENE     |          |          |          |          |          |          |   |     |     |
| 135 1234-TETRAHYDRONAPHTHALENE |          |          |          |          |          |          |   |     |     |
| 136 1,4-DIISOPROPYLBENZENE     |          |          |          |          |          |          |   |     |     |
| 137 NAPHTHALENE                |          |          |          |          |          |          |   |     |     |
| 138 DODECANE                   |          |          |          |          |          |          |   |     |     |
|                                | 0.7      | 0.3      |          |          | 0.7      | 0.8      | 4 | 0.6 | 0.8 |

Table 5 ctd.

## Occidental 1987 Air Quality Survey - VOC Analytical Results

| Sample Identification |          | COUNT   |         |         |         |         |          |  |  |  |  |  |  | AVERAGE |  | MAXIMUM |  |
|-----------------------|----------|---------|---------|---------|---------|---------|----------|--|--|--|--|--|--|---------|--|---------|--|
| Sample Start Time     | Duration | B80CT 1 | B80CT 2 | B80CT 3 | B80CT 4 | B90CT 1 | B120CT 1 |  |  |  |  |  |  |         |  |         |  |
| 10:11                 | 12:58    | 15      | 15      | 14      | 14      | 14      | 13       |  |  |  |  |  |  |         |  |         |  |
| One-Hour              |          | 34      | 30      | 26      | 26      | 28      | 24       |  |  |  |  |  |  |         |  |         |  |
| Analysis Start Time   | 11:19    | 3505    | 2003    | 1640    | 1761    | 2184    | 1938     |  |  |  |  |  |  |         |  |         |  |
| Sampling Date         | OCT 8    | 2469    | 1543    | 1183    | 1352    | 1742    | 1560     |  |  |  |  |  |  |         |  |         |  |
|                       |          | 70      | 77      | 72      | 77      | 80      | 81       |  |  |  |  |  |  |         |  |         |  |
|                       |          | 35.4    | 23.0    | 18.3    | 20.4    | 26.4    | 24.1     |  |  |  |  |  |  |         |  |         |  |
|                       |          | 23.7    | 12.3    | 9.7     | 9.5     | 18.5    | 17.0     |  |  |  |  |  |  |         |  |         |  |
|                       |          | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0      |  |  |  |  |  |  |         |  |         |  |
|                       |          | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0      |  |  |  |  |  |  |         |  |         |  |
|                       |          | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0      |  |  |  |  |  |  |         |  |         |  |
|                       |          | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0      |  |  |  |  |  |  |         |  |         |  |
|                       |          | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0      |  |  |  |  |  |  |         |  |         |  |
|                       |          | 11.6    | 10.7    | 8.7     | 10.9    | 7.9     | 7.1      |  |  |  |  |  |  |         |  |         |  |
|                       |          | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0      |  |  |  |  |  |  |         |  |         |  |
|                       |          | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0      |  |  |  |  |  |  |         |  |         |  |
|                       |          | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0      |  |  |  |  |  |  |         |  |         |  |
|                       |          | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0      |  |  |  |  |  |  |         |  |         |  |
|                       |          | 4.3     | 4.7     | 8.0     | 7.2     | 6.4     | 9.0      |  |  |  |  |  |  |         |  |         |  |
|                       |          | 4.4     | 4.6     | 5.9     | 7.4     | 5.4     | 6.9      |  |  |  |  |  |  |         |  |         |  |
|                       |          | 4.2     | 4.2     | 4.2     | 4.2     | 3.8     | 3.3      |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |
|                       |          |         |         |         |         |         |          |  |  |  |  |  |  |         |  |         |  |

Table 6

## Common Contaminants

## Maximum One-Hour Average Ground Level Concentrations

| DATE    | START<br>TIME | END<br>TIME | CO<br>(ppm) | THC<br>(ppm) | NO2<br>(ppm) | O3<br>(ppm) | W.S.<br>(km/hr) | W.D.<br>(deg.) |
|---------|---------------|-------------|-------------|--------------|--------------|-------------|-----------------|----------------|
| Oct. 8  | 10:05         | 12:05       | 0.3         | 1.2          | 0.01         | 0.014       | 18              | 310            |
| Oct. 8  | 16:35         | 21:05       | 0.4         | 1.2          | 0.02         | 0.023       | 10              | 295            |
| Oct. 9  | 10:35         | 16:05       | 0.4         | 1.4          | 0.02         | 0.020       | 8               | 190            |
| Oct. 10 | 10:05         | 15:05       | 0.4         | 1.7          | 0.02         | 0.019       | 16              | 360            |
| Oct. 12 | 09:35         | 15:35       | 0.4         | 1.4          | ND           | 0.031       | 3               | 270            |

## PCB Results

| Date    | Times |       | Comments                              | Concentrations                  |
|---------|-------|-------|---------------------------------------|---------------------------------|
| Oct. 8  | 16:45 | 21:00 | 8 half-hour Samples<br>2 Calibrations | ND<br>DL = 35 ng/m <sup>3</sup> |
| Oct. 9  | 10:30 | 16:00 | 4 half-hour Samples<br>1 Calibration  | ND<br>DL = 29 ng/m <sup>3</sup> |
| Oct. 10 | 10:00 | 15:00 | 3 half-hour Samples<br>2 Calibrations | ND<br>DL = 38 ng/m <sup>3</sup> |
| Oct. 12 | 9:30  | 16:10 | 4 half-hour Samples<br>2 Calibrations | ND<br>DL = 36 ng/m <sup>3</sup> |

ng/m<sup>3</sup> - nanograms per cubic metre;

DL - Detection Limit

ppm - Parts Per Million;

W.S. - Wind Speed;

ND - Not Detected

km/hr - Kilometres per Hour

W.D. - Wind Direction (From)